

REMARKS

Applicant has rewritten portions of the specification and Claims 1, 6 and 7. The changes from the previous version to the rewritten version are shown in attached Appendix A, with strikethrough for deleted matter and underlines for added matter.

Reconsideration of this application is respectfully requested in view of the above amendments to Claims 1, 6 and 7 and the following remarks. The Examiner rejected Claims 6 and 7 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim subject matter which Applicant regards as the invention. In particular, the Examiner stated that in Claim 6 the word "means" is preceded by the word "wherein" in an attempt to use a "means" clause to recite a claim element as a means for performing a specified function. However, since no function is specified by the word(s) preceding "means," it is impossible to determine the equivalents of the element, as required by 35 U.S.C. 112, sixth paragraph. In Claim 7, the Examiner stated that the term "capable of" is not defined by the claim and the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Accordingly, Applicant submits amended Claims 6 and 7. These amendments appear to obviate the rejection.

The Examiner further rejected Claims 1, 3-7, 9-16 under 35 U.S.C. 103(a) as being unpatentable over Driessen (4,790,242) in view of Japanese reference (59, 133). Applicant respectfully disagrees.

The Examiner states that Driessen discloses an apparatus and method for casting cheese, comprising a removable discharge manifold (11), wherein the manifold having a hollow interior chamber with may inlets for receiving starting material, a discharge opening (15, open bottom of chamber 12), an endless belt mounted adjacent to the manifold, a thickness control bar is mounted at one side of the chamber (12) for controlling the thickness of the web material, a belt driven mechanism for revolving the belt. The manifold chamber includes a top, bottom, end, upstream and downstream face plates, wherein the bottom face open to the casting belt, the downstream face open to the control bar, and the top face having inlets; each inlet is attached to a corresponding adjustable valve, and wherein the control bar is set a fixed distance from

the casting belt and a space is formed between a surface of the control bar for determining the thickness of the web material. As the Examiner notes, Driessen fails to disclose a roller mounted at the downstream face of the manifold chamber.

The Japanese reference discloses a method apparatus for forming a dough web material, comprising an endless belt, a rotatable press roller mounted to the downstream face of the manifold and being driven by a shaft in the same direction as the belt for the purpose of facilitating the material onto the casting belt.

The Examiner found it would have been obvious to one of ordinary skill in the art at the time the applicant's invention was made to have replaced Driessen's control bar with a rotatable press roller in order to facilitate the movement of the material from the manifold onto the casting belt as taught by the Japanese reference. Applicant respectfully disagrees that there is any suggestion in either of the cited references of Applicant's claimed combination.

In independent claims 1, 7 and 16, Applicant's present invention recites a casting line positioned down stream of the discharge manifold. The casting line comprises an endless casting belt that transports molten, viscous material upon the belt and wherein the molten, viscous material cools on the belt. The problem that Applicant was trying to solve occurs in the use of a molten, viscous material to form a thin sheet of the material on a belt where the material then cools. In applications, such as the manufacture of processed cheese, molten, viscous material is sometimes an "extreme" texture material (Page 4, lines 13-15). An example of the problem Applicant desired to solve is in the manufacture of process cheese, which may have such characteristics. These extreme textures tend to be stickier and more viscous than other types of cheese. Because of this stickiness, it becomes more difficult to form a continuous sheet of material using the process and apparatus described in prior art, such as Driessen, since the stickier material clogs the chambers of prior art manifolds and tends to tear while extruding onto the casting belt from a bar, such as the bar 18 in Driessen or other such standard manifold. The viscosity also affects the processing because more viscous materials tend to tear as they exit from the bar (Page 2, lines 15-20), such as that disclosed in Driessen.

Applicant's invention solves this problem by the use of a hollow chamber manifold that receives the molten, viscous material under pressure and distributes it evenly along the full length of the manifold and upon the casting belt of the casting line in combination with a roller. The manifold also determines the width of the sheet of molten, viscous material. The roller cooperates with the surface of the casting belt in order to extrude the molten, viscous material in a smooth consistent manner at the desired thickness (Page 4, lines 9-11). The manifold facilitates distribution of the material in such a way that the material forms continuous sheets and does not tear as it is being deposited on the belt (Page 3, lines 9-11).

The Japanese reference, on the other hand, is directed to dough and the roller is for a very different purpose. There is no suggestion of using the Japanese reference with the device of Driessen because the roller in the Japanese reference is not used to solve the problem solved by Applicant's invention. The Japanese reference neither discloses nor suggests the use of a molten, viscous material, nor could it. Dough, by definition, has to be stiff enough to knead. See Merriam-Webster's Collegiate Dictionary 348 (10th ed. 1999) (copy of page 348 attached). The material in the Japanese reference does not have the same issues as a molten material, such as cheese, as discussed above. There is no suggestion in the Japanese reference to combine a roller with the arrangement of Driessen because the roller in the Japanese reference is not intended for molten, viscous material that will cool on the casting belt nor is there any suggestion to use a roller in such a combination.

The differences in the use of the roller are exemplified by other structures disclosed in the Japanese reference. For example, the use of an auger to push the material toward the roller, as in the Japanese reference, would not work on molten cheese. The use of an auger in Applicant's invention would cut through the molten material and thus it would not provide the required pressure needed to extrude the material out of the manifold 11 toward the roller 16 (Page 11, lines 5-7). Without the required pressure streaking will occur (Page 12, lines 1-6). Also, the consistency of the material is not a factor in the Japanese invention, as it is in the applicant's invention.

The Japanese reference discloses a driven roller but does not disclose a driven belt. As recited in method claim 16 and dependent claim 14, Applicant's invention has a

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driven belt; however, the roller may freely rotate. More importantly, the applicant's invention may have a driven belt and a driven roller thereby insuring the material is distributed consistently and distributed continuously because both the belt 12 and the roller 16 run at the same surface speed and revolve in the same direction (Page 10, lines 10-17).

In the applicant's invention, the roller cooperates with the surface on which the material is distributed on in order to extrude the material in a smooth consistent manner (Page 4, lines 9-11). This is important if, for example, cheese slices are to be the end produce. The cheese slices are much more appealing if they are smooth and consistent. The smoothness of dough is not a concern in the Japanese reference because dough tends to rise thereby forming a non-smooth surface.

The Japanese reference neither discloses nor suggests the use of a casting line. More particularly, the Japanese reference does not disclose nor suggest the cooling of molten, viscous material on a casting belt as in the present invention. The material may need to be cooled so that additional processing can occur downstream of the roller 16, such as cutting of the material to the desired dimensions (Page 9, lines 18-19). Thus, neither Driessen nor the Japanese reference, alone or in combination, disclose or suggest the use of the roller in the present invention.

Therefore, it would not have been obvious to one of ordinary skill in the art at the time the applicant's invention was made to use a roller that is being used to roll a stiff material, such as, dough and where the thickness of the dough is not variable to roll a molten, viscous material, such as, molten cheese and be able to produce variable thickness of that cheese.

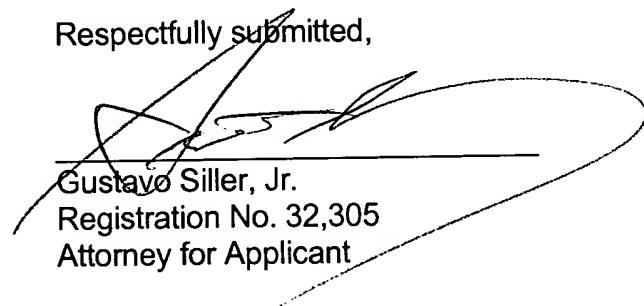
The Examiner further rejected Claims 2 and 8 under 35 U.S.C. 103(a) as being unpatentable over Driessen (4,790,242) in view of Japanese reference (59,133) as applied to Claims 1 and 7, and further in view of Collins (4,815,370). The Examiner states that Collins discloses a rice pressing apparatus in which a press roller can be made of steel having a rubber sleeve in order to smooth the web material surface and to be able to change the sleeve as it is worn out without replacing the roller. The Examiner further states that it would be obvious to one of ordinary skill in the art at the time the applicant' invention was made to have modified Driessen and the Japanese

reference with a roller made of steel with a plastic sleeve for the purpose of smoothing the web surface and being able to change the sleeve as it worn out without replacing the roller as taught by Collins. Applicant respectfully disagrees.

Applicant's invention of claims 2 and 8 recite a roller sleeve made of a non-stick material, such as polypropylene. It is an advantage that the roller surface does not stick to the molten, viscous material being extruded underneath it and even distribution of material in a continuous sheet is facilitated (Page 11, lines 7-10). Neither Collins nor the Japanese reference nor Driessen, alone or in combination, disclose or suggest having a non-stick roller surface. It would not have been obvious to one of ordinary skill in the art at the time of the applicant's invention to use a roller sleeve that is used to remove husks from rice to prevent sticking in the use of molten, viscous material.

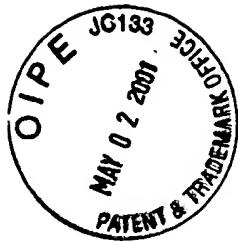
Therefore in view of the above amendments and remarks, Applicant respectfully submits that this application is in condition for allowance and such action is earnestly requested. If for any reason, however, the Examiner feels that a telephone interview would be helpful in resolving any remaining issues the Examiner is respectfully requested to contact Applicant's undersigned attorney.

Respectfully submitted,



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APPENDIX A
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In the Claims

Please amend Claims 1, 6, 7 and 16 as follows:

1. (Amended) An apparatus for forming a continuous sheet from a molten, viscous material comprising:

a pump connected to said inlet to pump said molten, viscous material under pressure;

a discharge manifold, said manifold having a hollow interior chamber, said chamber having at least one inlet for receiving said starting molten, viscous material from said pump and a discharge opening on at least one side for discharging said molten, viscous material, and a roller;

a casting line positioned down stream of said discharge manifold and comprising an endless casting belt that transports said molten, viscous material upon said casting belt;

an said endless casting belt mounted adjacent said manifold, said belt facing said discharge opening, said roller rotatably mounted adjacent said endless belt to form a gap between the an outer surface of said roller and the surface of said belt and said manifold disposed such that said molten, viscous material is received in said gap from said discharge opening, said belt being revolving driven such that said molten, viscous material passes between said gap to form said continuous sheet of molten, viscous material therebetween; and, wherein said molten, viscous material cools on said belt; and

a first drive mechanism connected to said belt for causing said belt to revolve.

6. (Amended) The apparatus as claimed in Claim 1 wherein means are provided for removably mounting said manifold is removably mountable from adjacent said endless belt so that more than one type of manifold may be interchangeably mounted adjacent said endless belt.

7. (Amended) A manifold for forming a continuous sheet from a molten, viscous material upon a casting belt of a casting line moving in a first direction, said manifold comprising:

a roller positioned such that a longitudinal axis of said roller is perpendicular to the first direction of said casting belt;

said casting line positioned down stream of said manifold for transporting said molten, viscous material upon said casting belt, wherein said molten, viscous material cools on said belt;

a chamber, having an interior portion, disposed adjacent to said roller; said chamber having top, bottom, end, upstream and downstream face plates;

said bottom face open to the casting belt along at least a part of the length of said bottom face;

said downstream face open to the roller along at least a part of the length of said downstream face;

said top face having at least one inlet;

said manifold capable of being mounted~~being~~ removably mountable adjacent a said casting belt in at least one mounting area.

16. (Amended) A method for forming a thin continuous sheet of material from a molten, viscous starting material comprising the steps of:

a. driving a casting belt of a casting line in a constant direction;

b. introducing said starting material through at least one inlet into chamber of a manifold that is mounted in a mounting area so that the manifold sits adjacent the casting belt at a fixed distance and disposes said starting material onto said casting belt through an outlet;

c. driving a roller in the same direction as said casting belt, said roller being attached to said manifold downstream of said outlet and above said outlet such that said starting material passes between said roller and said belt;

- d. drawing the starting material from said chamber through the tandem movement of the roller and the casting belt in the same direction; and
- e. dispensing a continuous sheet of material upon the casting belt as the belt is revolvingly driven; and
- f. cooling said continuous sheet of material on said casting belt.

